HENDERSON COUNTY GOVERNMENT/BOARD OF EDUCATION IS SEEKING BIDS ON THE FOLLOWING.	
DESCRIPTION OF SERVICE/PRODUCT:	CAST-IN-PLACE AND CONCRETE PAVING FOR NEW PLAYGROUND @ DARDEN **CALL OR VISIT WEBSITE FOR DETAILED REQUIREMENTS
CONTACT FOR ADDITIONAL INFORMATION:	WWW.HENDERSONCOUNTYTN.GOV , FINANCE, BIDS LINK DR. CHRIS YOUNG, PROJECT DIRECTOR, 731-968-0470
ADDRESS TO MAIL/BRING BIDS:	Henderson County Finance 17 Monroe St, 2nd Floor PO Box 495 Lexington, TN 38351
DATE/TIME BIDS MUST BE RECEIVED AND WILL BE OPENED:	DECEMBER 5, 2013 9:00am
ADDITIONAL BID REQUIREMENTS:	Proof of insurance is required with the bid. In accordance with TCA 62-6-119, when a construction bid is in excess of $25,000, the name, license number, expiration date and license classification of contractor must appear on the outside of the bid envelope or in the submission of the electronic bid.
EEO:	Henderson County Government/Highway/Solid Waste/ Henderson County BOE reserves the right to reject any and all bids. Henderson County Government/Highway/Solid Waste/ Henderson County BOE is an equal opportunity employer. Henderson County Government/Highway/Solid Waste/ Henderson County BOE is prohibited from discrimination based on race, color, national origin, sex, age, or disability. Complaints regarding discrimination should be filed with Director, Office of Civil Rights, 1400 Independence Av S.W., Washington, DC 20250. www.hendersoncountytn.gov

SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes cast-in-place concrete.

1.2 ACTION SUBMITTALS

A. Product Data: Provide data on joint devices and admixtures.

B. Samples: Submit two 12 inch long samples of expansion/contraction joint.

1.3 INFORMATIONAL SUBMITTALS

A. Source quality-control reports.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.5 QUALITY ASSURANCE

A. Perform work according to ACI 301.

B. Maintain copy of ACI 301 on site.

C. Obtain materials from same source throughout the Work.

D. Be responsible for correction of concrete work which does not conform to specified requirements, including strength, tolerances and finishes. Correct deficient concrete.

E. Testing and analysis of concrete shall be done by an ACI-certified Concrete Field-Testing Technician, Grade I.

F. Provide reinforcing steel made in the United States of America.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: Provide a standard brand of Portland cement complying with ASTM C150, Type I Normal.

B. Aggregates: ASTM C33, with additional attributes as specified herein.
1. Fine Aggregate: Provide washed natural sand having strong, hard, durable particles and containing not more than 2 percent by weight of deleterious matter such as clay lumps, mica, shale or schist.
2. Coarse Aggregate: Provide coarse aggregate consisting of clean, hard, fine grained, sound crushed rock containing not more than 5 percent by weight of flat, chip-like, thin, elongated, friable, or laminated pieces, not more than 2 percent by weight of shale or cherty material.
3. Any piece having a length in excess of five times average thickness shall be considered flat or elongated.

C. Water, General: Use only water which is clean and free from deleterious quantities of acid, alkali, salt and organic materials.

2.2 ADMIXTURES

A. Air Entraining Admixture: ASTM C260, with the following limits: 3 percent for maximum 2" aggregate, 5 percent for maximum 3/4" aggregate and 6 percent for maximum 1/2" aggregate.
1. "MB-VR 10" or "Micro-Air," Master Builders.
2. "Air Entrainment Agent," Meadows.
3. "Air Mix" or "AEA 92," Euclid Chemical Co.
4. Substitutions allowed.

B. Water Reducing Admixtures: ASTM C494, Type A.
1. "WR-77," Chem-Masters.
2. "Pozzolith 200N," Master Builders.
3. "Plastocrete 161HE," Sika Chemical Company.
4. "Eucon WR 91," Euclid Chemical Co.
5. Substitutions allowed.

C. Use only automatic dispensers for adding admixture.

D. Fly Ash: ASTM C618 Class C or F.

2.3 JOINT DEVICE MATERIALS

A. Joint Filler:
1. Type B: ASTM D1752; Processed board product made from granular crumb rubber derived from discarded truck tires and various low density polymer products; 40 pcf density; fully compressible with recovery rate of minimum 95 percent; AReflex Concrete Joint Filler," manufactured by J. D. Russell Company, Farmersville, TX or approved substitute.

2.4 CONCRETE MIX

A. Provide concrete for exterior work as follows:

1. Compressive Strength, f'c at 28 days: 4000 psi
2. Slump: 4 inches max.
3. Slump at ramps and sloping surfaces: 3 inches max.

B. Use quantity of water established by mix design. Do not exceed maximum quantity specified for grade of concrete. Use minimum quantity of water necessary to produce concrete of workability required. Do not supplement predecided quantity of water with additional water.
   1. Use a water-reducing admixture according to ACI instructions.

C. Do not use calcium chloride or admixtures containing more than 0.05 percent chloride ions. Do not use calcium chloride in architectural concrete.
   1. Certification: Provide written conformance of chloride ion content from admixture manufacturer prior to mix design review by Architect/Engineer.

D. Use accelerating admixtures in cold weather only when approved in advance by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.

E. Use set-retarding admixtures during hot weather only when approved by Architect/Engineer.

F. Add air entraining agent to concrete mix for concrete work subject to freeze thaw cycling.

G. Fly Ash Pozzolan Content: Maximum 25 percent of cement content.

2.5 SOURCE QUALITY-CONTROL

A. Provide testing and analysis of concrete mix design according to ACI requirements

B. Submit reports for concrete materials and mix design test not more than six months old for each proposed concrete mix prior to placing concrete of that mix according to Chapter 5 of ACI 318-89.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement, reglets, rebates and other items to be cast into concrete are accurately placed, positioned securely and will not cause hardship in placing concrete.

3.2 PREPARATION

A. Locate items to be embedded in concrete so as not to reduce strength of construction.

B. Before concrete is deposited upon or against concrete that has taken its initial set or has hardened, remove encrustations from forms and reinforcement.

3.3 PLACING CONCRETE

A. Place concrete according to ACI 301.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Designer.

C. Notify appropriate codes officials, Testing Agency and Architect/Engineer 24 hours minimum prior to placing concrete.

D. Ensure reinforcement, inserts, embedded parts and formed expansion and contraction joints are not disturbed during concrete placement.

E. Do not permit concrete to free drop more than 10'-0."

F. Deposit concrete direct into conveyances and direct from conveyances to final points of repose, except where troughs, buckets, or the like are used, in which case dump concrete into hoppers and then into conveyances.

G. Where tremies are used and through reinforcement, use a dumping box board, moving concrete there from by shovels or hoes.

H. Deposit concrete so that surface is kept level throughout, a minimum being permitted to flow from one position to another and place as rapidly as practicable after mixing.

I. Do not use concrete not placed within 15 minutes after leaving mixer.

J. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.4 COOL WEATHER PLACING

A. Comply with ACI 306 and protect concrete from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures.

B. When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing as needed to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 80 degrees F at point of placement.

C. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

D. Only specified non-chloride accelerator may be used. Calcium chloride or admixtures containing more than 0.1 per cent chloride ions are not permitted.

3.5 TAMPING AND CONVEYING

A. Thoroughly work concrete around reinforcement and embedded fixtures and into corners of forms, during placing operations.

B. Compact with tamping poles and by tapping forms until concrete is thoroughly compact and without voids. Decide number of tampers needed by quantity and method of placing concrete.

C. Exercise care to tamp concrete vigorously and thoroughly to obtain maximum density.

D. Use manual tampers and mechanical vibrators.

E. Exercise care to direct quick handling of vibrators from one position to another.

F. Do not over-vibrate concrete.

G. Do not move concrete by use of vibrator.

H. Screed slabs on grade uniformly according to plans, maintaining surface flatness.

3.6 STOPPAGES

A. Maintain flow surfaces of freshly placed concrete level whenever a pour is stopped, providing tight dams to prevent seepage of mortar and water.

B. Make construction joints only where unavoidable and then only at locations shown on approved shop drawings.

C. Provide keys and dowels at construction joints where indicated on Drawings and where concrete placement is interrupted.

D. At formed construction joints, provide #3 x 3'-0" dowels at 16 inches on center across joint.

3.7 INSTALLATION - JOINT DEVICES AND FILLER MATERIALS

A. Separate slabs on grade with 1/2 inch thick joint filler.

B. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

C. Install joint device anchors. Maintain correct position to allow joint cover to be flush with slab finish.

D. Apply sealant in floor joints according to manufacturer's instructions.

3.8 CONCRETE FINISHING

A. Finish concrete surfaces to requirements of Section 321313.

3.9 CURING AND HANDLING

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Spraying: Spray water over floor slab areas and maintain wet for 7 days.

3.10 CLEANING

A. On surfaces where smooth wood or waste molds have been used, scrub with a solution of concrete cleaner according to manufacturer's instructions.

B. After surfaces have been scrubbed, rinse thoroughly with water at 400 psi and four gallons per minute minimum.

3.11 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.12 FIELD QUALITY-CONTROL

A. Field inspection and testing will be done.

B. Inspection and Testing agency will perform tests for the following physical properties of concrete according to ACI 318-89, Building Code Requirements for Reinforced Concrete:
   1. Compressive Strength Test: 4 test cylinders per 50 cubic yards or 5000 square feet of surface area, whichever is greater; not less than 4 test cylinders per pour per day.
   2. Slump Test: Slump each cylinder of each strength tested.
   3. Air Entrainment: Decide entrained air of concrete of each strength test.
   4. Temperature: Decide temperature of concrete of each strength test at time of placement.
   5. Unit weight.

C. Tests of cement and aggregates will be done to ensure conformance with requirements stated herein.

D. Testing agency will test aggregate by method of sampling and testing of ASTM C33.

E. For portland cement, Testing agency will sample cement and decide properties by methods of test of ASTM C150.

F. Testing agency will not take concrete samples from first discharge of a full mixer unless first discharge is of questionable quality.

G. Testing agency will take samples of pumped concrete at the end of the discharge hose.

H. Testing agency will submit written reports to Architect/Engineer, for each material sampled and tested, prior to start of work. Provide the following:
   1. Project identification name and number,
   2. Date of report,
   3. Name of contractor,
   4. Name of concrete testing service,
   5. Source of concrete aggregates,
   6. Material manufacturer and brand name for manufactured materials,
   7. Values specified in referenced specification for each material and
   8. Test results.

I. Testing agency will indicate whether or not material is acceptable for intended use.

3.13 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections according to ACI 301.

3.14 DEFECTIVE CONCRETE

A. The following concrete will be deemed to be defective and shall be removed promptly from the job site:
   1. Concrete not meeting compressive strength.
   2. Concrete not meeting flexural tensile strength.
   3. Concrete placed not fully conforming to ACI Building Code requirements.
   4. Concrete which is not formed properly, is not true to intended alignment, is not plumb or level where so intended, is not true to intended grades and levels.
   5. Concrete which has voids or honeycomb that have been cut, resurfaced, or filled.
   6. Concrete which has sawdust, shavings, wood, or embedded debris; or does not conform fully to the Contract Documents.

B. Where defective concrete is found after removal of forms, cut out defective concrete, if necessary and make surfaces match adjacent surfaces. Work uneven surfaces and angles of concrete to a surface matching adjacent concrete surfaces.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

END OF SECTION

SECTION 321313
PORTLAND CEMENT CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes exterior cement concrete pavement for the following:
   1. Slabs on grade

1.2 RELATED DOCUMENTS

A. Section 033000 – Cast-in-place Concrete.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 PREINSTALLATION MEETINGS

A. Conduct conference at Project site.

B. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:
   1. Contractor's superintendent.
   2. Independent testing agency responsible for concrete design mixtures.

1.5 ACTION SUBMITTALS

A. Submittals: Follow Section 013300.

B. Product Data: Include data on joint filler, admixtures, and curing compounds,.

C. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials.

C. Field quality-control test reports.

D. Source quality-control reports.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

C. ACI Publications: Follow ACI 301 and ACI 302.

D. Concrete Testing Service: Engage and pay for a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

E. Obtain cementitious materials from same source throughout.

F. Ensure that ramped or sloped sidewalks are no longer than 30 feet, no steeper than 8.33% with a cross slope (perpendicular to path of travel) is no greater than 2%.

G. Conform to applicable sections of appropriate Department of Transportation for State in which Project is located. In the event of conflicts between this Specification and the appropriate State standards, the State standards shall take precedence.

1.8 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.1 FORMS

A. Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces; conform to ACI 301.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surface.

2.2 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; 60 ksi yield grade; deformed billet steel bars, unfinished.

B. Welded Steel Wire Fabric: Plain type, ASTM A185; in flat sheets or coiled rolls; unfinished.

C. Tie Wire: Annealed steel, minimum 16 gage size.

D. Dowels: ASTM A615; 40 ksi yield grade, plain steel, unfinished.

E. Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

G. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.

2.3 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Aggregate for Sub-base Course: As placed by Henderson County Highway Department.

2.4 CONCRETE MATERIALS

A. Cement: ASTM C150 Air Entraining-Type IA, Portland type, gray color.
1. Fly Ash: ASTM C 618, Class F.

B. Fine and Coarse Aggregates: ASTM C33; Class 4M, uniformly graded.

C. Water: Clean and not detrimental to concrete.

D. Air Entrainment: ASTM C260, 6 percent.

E. Chemical Admixture: ASTM C494, Type A - water reducing type.

2.5 CURING MATERIALS

A. Clear Waterborne Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B.

B. Water: Clean and not detrimental to concrete.

2.6 ACCESSORIES

A. Expansion- and Isolation-Joint Filler:
   1. Processed board product made from granular crumb rubber derived from discarded truck tires and various low density polymer products; 40 pcf density; fully compressible with recovery rate of minimum 95 percent.

2.7 CONCRETE MIXTURES

A. Mix concrete according to ASTM C94, Alternative 2. Furnish batch certificates for each batch discharged and used in the Work. On site batch mixing will not be permitted.

B. Provide concrete of the following characteristics:
   1. Compressive Strength: 4000 psi at 28 days.
   2. Air Entrainment: 5 to 8 percent.
   3. Slump Range: 8 inch for concrete with Type A admixture; 3 inch for other concrete.
   4. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.

C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.

D. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.

E. Use set-retarding admixtures during hot weather only when approved by Architect/Engineer.

F. Use calcium chloride only when approved by Architect/Engineer.

G. Add air entraining agent to concrete mix for concrete work exposed to exterior.

H. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.
   1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.9 SOURCE QUALITY-CONTROL

A. Submit proposed mix design to appointed firm for review prior to commencement of work.

B. Test samples according to ACI 301.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade and granular base are ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

C. Proof-roll prepared sub-base below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
   1. Completely proof-roll sub-base in one direction. Limit vehicle speed to 3 mph.
   2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
   3. Sub-base with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Section 312000 Earthwork.

D. Moisten base to minimize absorption of water from fresh concrete.

E. Notify Architect/Engineer minimum 24 hours prior to commencement of concreting operations.

F. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 FORMING

A. Place and secure forms to correct location, dimension and profile.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint fillers vertical in position, in straight lines. Secure to formwork during concrete placement.

3.4 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Place dowels to achieve slab and alignment as detailed.

D. Provide dowelled joints at interruptions of concrete with one end of dowel set in capped sleeve to allow longitudinal movement.

3.5 JOINTS

A. Place contraction joints at 12' 6" foot intervals to correct elevation and profile. Align joints.

B. Place concrete to grid pattern.

C. Place joint filler between paving components and building or other appurtenances.

D. Contraction Joints: Form weakened-plane contraction joints as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 3/16-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks, and before 8 hours have passed after placing. Cut 1/4 into depth of slab.

E. Edging: Tool edges of pavement in concrete after initial floating with an edging tool to a [3/8-inch (10-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 PLACING CONCRETE

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

I. Screed pavement surfaces with a straightedge and strike off.

J. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

K. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

L. Hot Weather Placement: Comply with ACI 305.

M. Cold Weather Placement: Comply with ACI 306.

N. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.

O. Place concrete continuously between predetermined expansion joints. Do not break or interrupt successive pours such that cold joints occur.

3.7 FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Paving: Light broom .

C. Place curing compound on exposed concrete surfaces immediately after finishing. Follow manufacturer's instructions.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
   1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
   2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 PAVEMENT TOLERANCES

A. General: Comply with tolerances of ACI 117.

B. Abrupt Changes in Elevation: 1/4 inch, maximum.

3.10 FIELD QUALITY-CONTROL

A. Field inspection and testing will be performed.

B. Four concrete test cylinders will be taken for every 50 or less cubic yards of concrete placed each day.

C. One additional test cylinder will be taken during cold weather and be cured on site under same conditions as concrete it represents.

D. One slump test will be taken for each set of test cylinders taken.

E. One air entrainment test will be taken for each set of test cylinders taken.

F. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature and test samples taken. Submit with record documents.

G. Pay for subsequent tests made necessary by failure of work to conform to Contract requirements.

3.11 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section..

B. Drill test cores, where directed by Architect/Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from premature drying, excessive hot or cold temperatures, mechanical injury, and other damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION